

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

DAM, DIVERSION

(no.)
CODE 348

DEFINITION

A structure built to divert all or part of the water from a waterway or a stream.

PURPOSE

To divert all or part of the water from a waterway in such a manner that it can be controlled and used beneficially or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to permanent structures, constructed of materials having an expected life span consistent with the purpose of the structure. It does not apply where Diversion (362), Floodwater Retarding Dam (402), or Grade Stabilization Structure (410) would be used.

This practice applies where:

A diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservation use of soil and water resources;

Diversion of water from an unstable watercourse to a stable watercourse is desirable;

The water supply available is adequate for the purpose for which it is to be diverted;

Adverse environmental impacts resulting from the practice can be overcome.

CRITERIA

Laws and Regulations. This practice must conform to all federal, state, and local laws and regulations. Laws and regulations of particular concern include those involving water rights, land use, land disturbed by construction, pollution control, property easements,

wetlands, preservation of culture resources, and endangered species.

General. Unless otherwise specified herein, earthfill dams with or without conduit spillways shall be designed as follows. Class (a) dams with a product of storage times effective height of the dam of less than 3,000 and with an effective height of the dam of 35 feet or less shall meet the standard for Pond (378), except full flow open structures must meet Grade Stabilization Structure (410).

Class (a) dams having a product of storage times effective height of the dam of 3,000 or more; those more than 35 feet in effective height; and all Class (b) and Class (c) dams shall meet or exceed the requirements specified in TR-60.

Environmental Impacts. The impact of a proposed dam on water quality, fish and wildlife habitat, forest, and visual resources shall be evaluated and the techniques and measures necessary to overcome the undesirable effects shall be identified and addressed.

Materials. All materials to be used in constructing the diversion dam and appurtenances shall have the strength, durability, and workability required to meet the installation and service conditions of the site.

Structural design. Appurtenant structures shall be designed to withstand all anticipated loads.

Outlet works. If part of the flow is to be diverted, the outlet works must provide for positive control of both maximum and minimum flow rates consistent with the purpose for which the diversion is made. The outlet works must provide for safe diversion of all expected flows, considering such hazards as the potential for erosion, cavitation, and reduction in flow capacity due to the buildup of debris and sediment.

Conservation practice standards are reviewed periodically and updated if needed. The current version of this standard is on our eFOTG web site available at www.sd.nrcs.usda.gov or may be obtained at your local Natural Resources Conservation Service.

Where control is needed to regulate flow (or prevent long duration flow) into canals or ditches, a headgate shall be installed.

Diversion dams installed in water channels for the purpose of waterspreading by backing water onto adjacent flood plain lands shall have an outlet pipe to permit lowering the water to a satisfactory level below the flood plain. The outlet pipe shall be sized to drain the pool in time to prevent damage to the flooded area.

Bypass works. The bypass works must be capable of passing all flows needed to satisfy downstream priorities and all flows in excess of diversion requirements, including expected flood flows. This may require a combination of orifices, weirs, and gates designed to meet the requirements of the site. The bypass works must provide for safe bypass of all expected flows, considering such hazards as the potential for erosion, cavitation, and reduction in flow capacity due to the buildup of debris.

Special-purpose works. If debris, bed load materials, or sediments are present under flow conditions subject to diversion, provision shall be made to bypass or remove materials that may be detrimental to the functioning of the outlet works, to other parts of the works, or to areas to which diversion is made. This may require the use of settling basins, debris traps, trash guards, or sluiceways, depending on site conditions.

Vegetation. Disturbed areas, not otherwise covered or protected, shall be vegetated as soon as practicable after construction. If soil or climatic conditions preclude the use of vegetation, and protection is needed, non-vegetative materials, such as mulches, gravel, and rock riprap may be used. As a minimum, seedbed preparation, seeding, fertilizing, and mulching shall comply with the South Dakota Technical Guide. The vegetation shall be maintained and undesirable species controlled.

CONSIDERATIONS

The effects of this practice on water quantity, water quality, and the environment should be considered during the planning process. Effects to be considered are:

Effects on the water budget, on volume and rate of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge;

Effects of the use of diverted waters for irrigation;

Effects on the original watercourse, on the newly constructed watercourse, and on the area where the water is being diverted to and from;

Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff;

Potential temperature changes in downstream waters resulting from differences in bank shading in different watercourses;

Potential changes in the amount of soluble substances infiltrating and available for ground water recharge as well as the potential for salt pick-up;

Potential for introducing new plant or animal species to either the upstream or downstream waters;

Effects on the natural migration of fish.

PLANS AND SPECIFICATIONS

Plans and specifications for installing diversion dams shall meet this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be prepared for use by the owner/operator. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. Typical maintenance may include periodic inspection and the removal of accumulated trash and debris from the structure and the repair of gates, screens, and other appurtenances.